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Cushing, Richard J.

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In order to preserve its warfighting effectiveness, the Department of Defense employs three interrelated decision support systems to guide the acquisition of military capabilities. These processes have been implemented to enhance decision-making at the strategic level, which ultimately result in a military force that is equipped with the necessary capabilities to prevail in the anticipated threat environment.

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MARINE CORPS UNIVERSITY

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MASTER OF MILITARY STUDIES

DEFENSE ACQUISITIONS AND NATIONAL SECURITY IN A DECLINING BUDGET ENVIRONMENT

SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF MILITARY STUDIES

MAJ RICHARD J. CUSHING, USMC
AY11-12

MENTOR AND ORAL DEFENSE COMMITTEE MEMBER:

DR. ERIC Y. SHIBUYA
ASSOCIATE PROFESSOR OF STRATEGIC STUDIES

APPROVED: ____________

DATE: 12 APRIL 2012

ORAL DEFENSE COMMITTEE MEMBER:

DR. JONATHAN PHILLIPS
ASSOCIATE PROFESSOR OF MILITARY HISTORY

APPROVED: ____________

DATE: 12 April 2012

LTC Brian K. Yee
MILFAC
APPROVED ____________
12 April 2012

DISCLAIMER

EXECUTIVE SUMMARY

Title: Defense Acquisitions and National Security in a Declining Budget Environment

Author: Major Richard J. Cushing, United States Marine Corps

Thesis: In a declining budget environment, do the primary Department of Defense Decision Support Systems adequately support capabilities based decision-making in support of the national security and defense strategies?

Discussion: The financial crisis, which began in 2008, and the subsequent budgetary pressures placed upon United States, will lead to decreases in defense spending. In order to preserve its warfighting effectiveness, the Department of Defense employs three interrelated decision support systems to guide the acquisition of military capabilities. These processes have been implemented to enhance decision-making at the strategic level, which ultimately result in a military force that is equipped with the necessary capabilities to prevail in the anticipated threat environment. Decoupling budgetary realities from the development of military capabilities is not possible when resources are limited. However, prioritizing national security objectives and developing military capabilities to support these priorities is a disciplined process. Identifying gaps in military capability requirements are risks that require mitigation. Therefore, risks will increase in a security environment typified by declining budgets and steady or increasing requirements. However, the decision support systems will acknowledge higher priority requirements and will direct the required financial resources to developing and sustaining military capabilities of the highest priority.

Lessons Learned and Conclusions: The decision support systems employed by the Department of Defense provide decision makers with useful information that can then be applied to prioritization and resource allocation as it relates to the development of military capabilities. The expectation is that the information generated through this process will result in a rational decision. More often than not, this is likely the case. However, there is evidence that suggests that in spite of this analytical approach the process can yield unanticipated results. Unanticipated results are likely contextual and are reflective of the realities of a given time and place. Overall, the system works well within an enormously complex organization. In an environment typified by reduced defense budgets, the decision support systems will aid in making tough decisions about the capability requirements of the force and will consistently aid decision makers to make the best decisions relative to the national security environment.

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INTRODUCTION

> *The U.S. military receives billions of dollars of weapons and their supporting equipment each year. Those weapons and their supporting equipment flow out of what must be one of the most complicated decision-making systems in the world, which employs thousands of people across the United States who follow hundreds of thousands of pages of arcane documents containing millions of rules and regulations as they convert billions of dollars into military hardware.*[1]

In Fiscal Year (FY) 2012, the Department of Defense (DoD) will execute a total budget authority of $662 billion.[2] Within this budget is funding that provides for a workforce of approximately 3.6 million people.[3] Developing and acquiring the capabilities and equipment that enable operations amounts to $188.3 billion in procurement and research and development funding (Appendix A summarizes the 2012 DoD budget request by appropriation title).[4] To place the size of the DoD into perspective, the President's Budget Request for FY 2012 allocates 54 cents of every dollar of discretionary budget authority to the Department of Defense.[5] In an overall budget request of $3.729 trillion[6], the DoD's share is nearly 18% of the entire U.S. budget. This represents the "cost" to the Nation for its military. It also underscores the size and complexity of the environment in which defense acquisitions takes place. In addition, it employs more people than Wal-Mart[7] and its budget surpasses the revenues of the largest global corporation by 57%.[8]

The economic landscape in the wake of the 2008 financial crisis threatens many nations' ability to meet their security needs – including the United States. The budgetary restrictions that

the United States faces present a challenge to maintaining strong national security. As competition for resources intensifies, the result will be elimination of underperforming or unnecessary programs, and delays or modification to programs that survive. This paper will examine the process through which major defense acquisition programs are conceived, funded, developed, and fielded with an emphasis on how this process matches required capabilities to the overarching security strategy of the nation. A well-designed process allows for the alignment of resources to strategic objectives. This ultimately leads to informed decision-making and enhances efforts to prioritize different programs. The Marine Corps Expeditionary Fighting Vehicle (EFV) and Amphibious Combat Vehicle (ACV) programs will be examined in order to determine how well these principles were applied to these two programs.

BACKGROUND: THE DEPARTMENT OF DEFENSE (DOD) DECISION SUPPORT SYSTEMS

> *It is probably fair to state that the current defense acquisition process is constructed on a foundation of distrust.*[9]
>
> *The statutes, regulations, and cultural norms that govern the procurement system reflect the view that, left to their own devices, government officials will not live up to the ideals that we hold.*[10]

Notwithstanding the negative perception of the procurement process outlined by Sorenson and Kelman, the DoD relies on three related decision support systems (i.e. "Big" Acquisitions, or "Big A") to initiate requirements, fund their development, and manage the total lifecycle of each program. In order to accomplish this undertaking, the DoD relies principally on the following interconnected processes: Planning, Programming, Budgeting and Execution (PPBE); the Joint Capabilities Integration and Development System (JCIDS); and the Defense

Acquisition System (i.e. “Little” Acquisitions, or “Little A”). Figure 1 below depicts the relationship of these three processes:

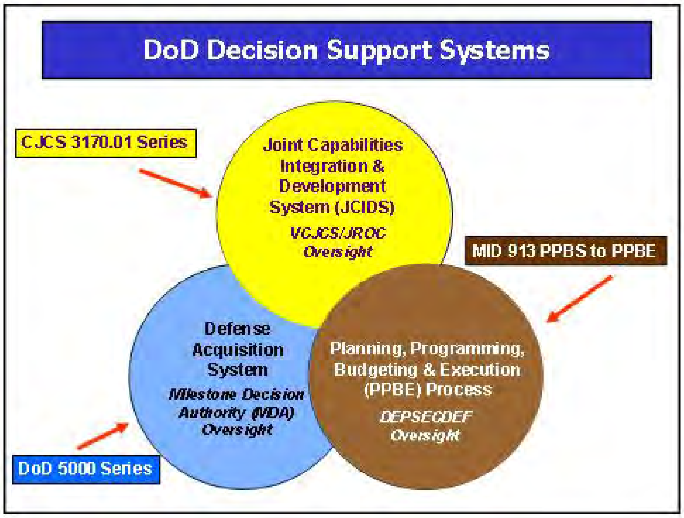


Figure 1: The DoD Decision Support System
(Source: Defense Acquisition Guidebook)

Each of these processes represents an input into translating needs into capabilities. PPBE aligns financial resources to fund each phase of a program’s lifecycle. JCIDS identifies capability gaps and determines how to fill those gaps. The Defense Acquisition System is the process through which the requirement and the financial resources produced through the JCIDS and PPBE processes are converted into weapons systems and equipment.

Planning, Programming, Budgeting and Execution. The PPBE process traces its modern origins to former Secretary of Defense Robert McNamara and the system that he introduced during his tenure in the 1960s.[11] The phases of this process are highlighted below.

Planning. The strategic environment is captured in the President’s National Security Strategy (NSS) with the Secretary of Defense (SECDEF) articulating the DoD’s role in fulfilling that strategy through the National Defense Strategy (NDS).[12] In developing the National Military

Strategy (NMS), the Chairman of the Joint Chiefs of Staff (CJCS) relies on the NSS and NDS to "provide 'the what,' and the NMS provides the 'how' in aligning ends, ways, means, and risk to accomplish the missions called for in support of U.S. national interests and objectives."[13] The Quadrennial Defense Review (QDR) is an additional input into strategic planning "[a]nd set[s] a long-term course for DoD as it assesses the threats and challenges that the nation faces and re-balances DoD's strategies, capabilities, and forces to address today's conflicts and tomorrow's threats."[14]

Prior to 2008, the Strategic Planning Guidance (SPG) was published to articulate the strategy for planning and programming purposes. The SPG was replaced with the Guidance for the Development of the Force (GDF), a long-range strategic planning document (20 years).[15] In 2010, the GDF and Joint Programming Guidance (JPG) were merged into a single document – Defense Planning and Programming Guidance (DPPG).[16] The ultimate objective of the planning phase of the PPBE process is to "identif[y] capabilities that support US national security objectives, develops a strategy to utilize capabilities in response to threats, and determines capabilities and forces required to support the strategy."[17]

Programming. Programming entails the construction of a fiscally constrained Program Objective Memorandum (POM) from each DoD component that outlines the programs necessary to meet the guidance contained in the DPPG.[18] The various POMs are subjected to a review process with issues and other considerations being vetted at multiple levels to include the services, the CJCS and the Office of the Secretary of Defense (OSD) before being approved by the SECDEF in the Program Decision Memorandum (PDM).[19] Other stakeholders such as the Combatant Commanders have input into this process via the Integrated Priority List (IPL), which prioritizes requirements and identifies critical shortfalls.[20]

Budgeting. Budgeting consists of "Convert[ing] the programmatic view into the format of the congressional appropriation structure, along with associated budget justification documents."[21] During this stage of the process, the POM submissions of the various components and agencies are merged into a single budget. This submission becomes a part of the President's Budget, which is submitted to Congress in February of each year.

Execution. Execution consists of reviews to provide department leaders with an assessment of the effectiveness of prior resource allocation decisions.[22] Execution reviews allow adjustments to be made in future budgets based on current year execution. These reviews are a part of the cyclical nature of the PPBE process as it works to align the nation's resources with warfighting requirements.

To put the PPBE process into perspective, using the EFV Program as an example, the leadership within the Departments of Defense and the Navy, as well as, the Marine Corps leadership recognized the negative financial implications of fielding the EFV. The planned funds for the EFV did not adequately account for cost growth within the program. To program additional funding for the effort would require an increase in the top line of the budget, or redirecting funds from other programs to the EFV. The result of this budgetary review underscored the need to seek an alternative solution to meet the Marine Corps' amphibious capability requirement and to do so in a way that would not negatively affect other procurement programs within the Marine Corps.

Joint Capabilities Integration and Development System. The Joint Capabilities Integration and Development System (JCIDS) is a relatively new process that was introduced into the DoD by Secretary of Defense Donald Rumsfeld in 2003. The goal of JCIDS is to, "bring about more

‘joint’ thinking into the weapons development process.”[23] JCIDS replaced the Joint Warfighting Capabilities assessment (JWCA), which was introduced by Admiral William Owens in the mid-1990’s. “The JWCA didn't achieve the expected results …because it was a ‘bottom-up’ review process that began at the service level and ended at the JROC.”[24] JCIDS was intended to provide a “top down” approach to acquisitions planning and more closely align the services’ programs to the needs of the combatant commanders.[25]

JCIDS can best be described as the “requirements” process. Simply stated, “JCIDS plays a key role in identifying the capabilities required by the warfighters to support the National Defense Strategy, the National Military Strategy, and the National Strategy for Homeland Defense.”[26] The core task of JCIDS is to validate warfighter requirements and the outcome of this assessment can be placed into one of three broad categories: (1) developing a new material solution; (2) initiating a Doctrine, Organization, Training, Leadership and education, Personnel, or Facilities (DOTLPF) change recommendation if developing a new material solution is inappropriate, or (3) pursuing a combination of a new material solution, in conjunction with changes to the DOTLPF continuum, in order to address the capability gap. In the context of JCIDS, any decision that includes the development of a new material solution will establish a link with the Defense Acquisition System.

Within JCIDS, the Joint Requirements Oversight Council (JROC) performs myriad functions to support the CJCS in providing the SECDEF with advice on requirements.[27] Fundamental to the JCIDS process are capabilities based assessments, which best determine how to fill capability gaps. Key to this system is the Joint Staff Director (J-8), or “Gatekeeper.” The Gatekeeper receives and reviews all JCIDS related documents and assigns a Joint Potential Designator (JPD) that determines the process flow for a requirement within JCIDS.

In addition to assigning a JPD to all JCIDS documents, the Gatekeeper assigns lead and support roles to the appropriate Functional Capabilities Board (FCB) member(s). Currently there are eight FCBs within JCIDS that are aligned with their respective Tier I Joint Capability Area (JCA). The "FCBs provide the assessments and recommendations required for the Joint Requirements Oversight Council (JROC) to validate and prioritize (if required) joint military capabilities needed to comply with the…"[28] strategic planning documents addressed above. To fulfill the role of validating and prioritizing capability needs, the FCBs conduct capability gap assessments. These assessments follow a ten-step process as set forth in an FCB instruction issued by the Joint Chiefs of Staff:

1. Receive capability gap inputs via combatant commanders (e.g. Integrated Priority List) and other sources.

2. Assign received capability gap inputs to the appropriate lead and support FCBs.

3. Combine like deficiencies into a "synthesized gap" which allows for an overarching assessment of the gap within the DoD.

4. Gather information from various sources such as other programs the science and technology community, etc. in order to perform an assessment.

5. Prioritize capability gaps by first reassessing the criteria that the capability gaps will be measured against and then prioritizing the gaps against the criteria inclusive of any changes.

6. Recommend actions to be taken; they fall into six categories:

    a. Support Program of Record (POR) development/ongoing efforts

    b. Make programmatic changes

    c. Invest in science and technology

    d. Conduct further studies/analysis

e. Other

f. Take no action and accept the identified risk

7. Brief results of the capabilities gap assessment to various levels of senior leadership for concurrence/recommendations.

8. Brief the JCB and JROC for their decision on the action item.

9. Record decisions made in a JROC memorandum (JROCM).

10. Close out the capability gap assessments and repeat the process for new and recycled initiatives.[29]

A graphic depiction of the ten-step process is provided in Appendix B.

The result of the JCIDS process is that identified capability gaps are validated and approved if required to meet the national security needs of the United States. Validated requirements that entail the development of a new weapons system become the responsibility of the material developers and lead to the establishment of an acquisition program. The material developers utilize the Defense Acquisition System to manage the cost, schedule, and performance parameters of these highly complex programs.

Applied to the EFV Program's termination, the JCIDS process has resulted in the drafting of a requirement for a different amphibious assault capability. The ACV Initial Capabilities Document (ICD) reflects modifications to doctrine that allows for adjustment of the amphibious assault requirement. Thus, the ACV requirement will be reflective of the national strategy, synchronized with current operating concepts, and aware of the fiscal constraints that will influence its development and fielding.

Defense Acquisition System. The Defense Acquisition System “exists to manage the nation's investments in technologies, programs, and product support necessary to achieve the National Security Strategy and support the United States Armed Forces.”[30] Again, the theme of tying defense capabilities to national security objectives is repeated and helps to guide decision-making for defense acquisition programs. The primary objective of the acquisition process is to meet user needs in a timely manner.[31] The Defense Acquisition System is intended to be flexible, responsive, innovative, disciplined, and streamlined while maintaining effective management.[32] The defense acquisition process receives inputs from the PPBE (funding) and JCIDS process (requirement) in order to produce a militarily useful and supportable capability. Appendix C provides a breakdown of the criteria for determining the acquisition category for a defense program.

The principle method by which user needs are translated into militarily useful end items is through the employment of a lifecycle management perspective that incorporates milestones and decision reviews to monitor progress. Milestone reviews and decision points occur at various stages of a program’s lifecycle and can be tailored to each specific phase (Figure 2 depicts the milestones and decision points employed in the management and execution of acquisition programs). Within this framework, the two individuals that are primarily responsible for the execution of a program are the Milestone Decision Authority (MDA) and the Program Manager (PM). The MDA is responsible for the overall outcome of the program and the review of all program activities at each required milestone (MS) or decision point (DP).[33] As described in the Defense Acquisition Guidebook, “Milestone decisions initiate programs and authorize entry into the major acquisition process phases: Materiel Solution Analysis; Technology Development; Engineering and Manufacturing Development (EMD); and Production & Deployment.”[34]At each

MS or DP, the MDA assesses whether or not a program has met the established exit and entrance criteria necessary to progress to the next phase.

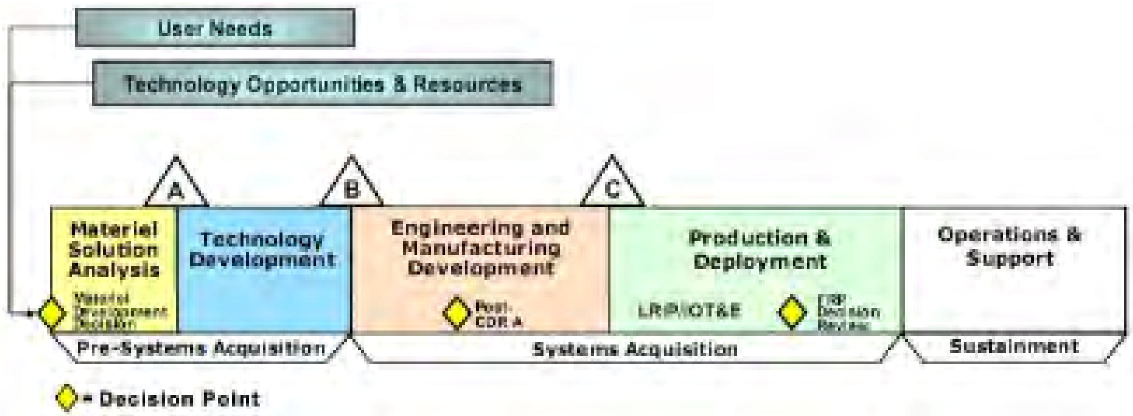


Figure 2: DOD LIFECYCLE FRAMEWORK CHART
(Source: Defense Acquisition University, Defense Acquisition Portal)

The PM is responsible for the day-to-day planning and operation of a program and is accountable to the MDA for the cost, schedule, and performance of the program.[35] PMs manage cost, schedule, and performance within the trade space allocated by an approved program baseline. This framework allows for flexible management and tailoring of an acquisition program based on the program's current goals and objectives. In addition, periodic management reviews ensure that a program continues to make acceptable progress towards achieving the overall program goals and objectives.

The acquisition lifecycle can be further broken down into three stages: pre-systems acquisition, systems acquisition and sustainment. Pre-systems acquisition includes the Material Development Decision (MDD) and the MS A and MS B decision reviews. The MDD is the starting point for defense acquisitions and it is at this point that the MDA decides the phase that the program will enter into the defense acquisition system. The ICD is the governing document that establishes initial capability requirements for the user. The Material Solution Analysis Phase occurs after the MDD and includes completion of the Analysis of Alternatives (AoA), which

leads to a material solution being identified to the program sponsor, as well as the Technology Development Strategy (TDS) that informs much of the activity in the following phase. The Material Solution Analysis Phase concludes with a successful MS A review.[36]

The Technology Development Phase utilizes the TDS in order to help, "reduce technology risk, determine the appropriate set of technologies to be integrated into a full system, and complete a preliminary design."[37] Other assessments include: (1) determining whether the technology is capable of operating in the relevant environment; (2) conducting a preliminary design review; (3) identifying and assessing any manufacturing risks related to the technology. This phase concludes with a successful MS B review. MS B is the point at which an acquisition program is "initiated" and it is the point at which the program enters into the systems acquisition stage.[38]

The Engineering and Manufacturing Development Phase serves to refine the preliminary design carried forward and continues to utilize sound program management practices and disciplined systems engineering to fully integrate the system. Activities during this phase are guided by a Capabilities Development Document (CDD), which supplants the ICD used during prior phases. During this phase, a Post-Critical Design Review will take place which is a formal review conducted by the MDA to help determine system maturity, manufacturing feasibility and an estimate on reliability among other things.[39] This phase concludes with the MS C review, which formally commits the DoD to production and authorizes Low Rate Initial Production (LRIP) of the approved system in order to conduct operational testing and evaluation. For programs that do not require LRIP, this MS review serves as the full rate production decision.[40]

Following the MS C review, a program proceeds into the Production and Deployment Phase with activities being guided by the Capability Production Document (CPD). Programs

with Initial Operational Test and Evaluation (IOT&E) requirements will conclude test and evaluation activities and receive a successful full rate production decision. Once full rate production has been authorized by the MDA, the weapons system is fielded. This also marks the conclusion of the system's acquisition stage of the program's lifecycle.

Following the Production and Deployment Phase, the program enters the last, and generally the longest, phase of the acquisitions process. The Operations and Support phase consists of all sustainment activities related to a fielded item, up to and including disposal of the weapons system. In a broad sense, this phase consists of lifecycle sustainment and disposal activities. Lifecycle sustainment is logistics intensive and accounts for the majority of a program's total lifecycle costs (estimates are upwards of 70%). During lifecycle sustainment, all of the operations and maintenance costs for placing a new weapons system in service occur such as fuel, spare and replacement parts, maintenance and repair of dead lined equipment and other direct operating costs. The end of a program's life takes place at disposal. During disposal, the costs associated with the demilitarization and disposal of the system are incurred.

Viewed through the lens of the EFV Program, the acquisition process provided important feedback to the Program Office regarding total lifecycle costs and the size of the investment that the Marine Corps would be making by proceeding to full rate production of the EFV. The deliberate nature of the acquisition system, with its milestone reviews, is intended to minimize risk in successive phases of the program. This deliberate process identified issues early enough in the development of the EFV, such as the Operational Assessment in 2006 referenced in Appendix D. While the issues were correctable, the financial, and perhaps operational, landscape experienced significant changes. The reality of the situation was that the EFV was no longer affordable, and preventing the program from proceeding into full rate production and terminating

the program became the best option available to the decision makers. While perceived by many to be slow and cumbersome, the acquisition system does allow for multiple off ramps for capabilities that are either technically immature, unaffordable, or that otherwise do not advance U.S. security interests.

Early Amphibious Assault Capabilities

Leading up to the development of the Expeditionary Fighting Vehicle (EFV), the Marine Corps drew upon a long history of conducting amphibious operations and developing the capabilities to support those operations. The Marine Corps pioneered the use of an amphibian tractor to transport assault troops from ship-to-shore during the assault on Tarawa during World War II (WW II).[41] Throughout WW II, the Marine Corps relied on the Landing Vehicle Tracked-1 (LVT-1), which was fielded in July 1941, and other variants of the LVT to support both logistics requirements and the landing of embarked combat troops.[42] In 1953, the LVT (P)-5 was fielded as the replacement amphibian tractor for the Marine Corps.[43] In 1972 the LVT (P)-7 was introduced as the replacement for the LVT (P)-5.[44] Since its initial fielding, the LVT (P)-7 has undergone two Service Life Extension Programs (SLEP) and other product improvements during its time in service. Along the way, it was re-designated as the Amphibious Assault Vehicle-7 (AAV-7).[45] The AAV-7 family of vehicles remains the Marine Corps fielded amphibious assault vehicle to this day – far surpassing the ten-year service life originally intended for the vehicle.[46]

Initial Efforts to Replace the AAV-7

Despite the fact that it has been forty years since the Marine Corps last fielded a new amphibious assault capability, there has been significant energy invested in developing and fielding a replacement for the AAV-7. In 1971, prior to fielding the AAV-7, the Marine Corps

was already considering what the replacement program should be. These efforts culminated with an operational requirement in 1973 that established the high water speed Landing Vehicle Assault (LVA) Program. However, this effort was subsequently cancelled by the then Commandant of the Marine Corps General Wilson in 1979.[47] In deciding to cancel the LVA, the Commandant cited the requirement to conduct a surface landing from beyond 15 miles as unnecessary, the growth of the vehicle (footprint), and affordability concerns. However, Wilson did approve the requirement for the LVT(X), a low water speed vehicle with an anticipated Initial Operational Capability (IOC) in 1986.[48] By 1985, the LVT(X) program was also cancelled amid questions regarding the validity of the requirement and the relative value of the technology compared with its cost (i.e. affordability). In August 1988, the Advanced Amphibious Assault (AAA) program was approved by the Under Secretary of Defense for Acquisitions and would become the identified replacement for the AAV-7.[49]

From the Advanced Amphibious Assault Vehicle to the Amphibious Combat Vehicle

The cancellation of the LVT(X) program and the identification of the AAAV as the replacement for the AAV-7 coincided with changes to amphibious strategy and doctrine. In the mid-1980s doctrinal changes led to the implementation of an over the horizon (OTH) strategy for amphibious forces. This strategy signified that the previous launch distance from ship-to-shore of 2.5 miles would be supplanted by a new ship-to-shore distance of 20-25 miles. These changes to amphibious doctrine, one pillar of the DOTMLPF spectrum discussed previously, necessitated modernization of the Marine Corps CH-46 Sea Knight helicopter as well as the development of an amphibious assault vehicle that could meet the OTH requirement.[50] A December 1987 Mission Area Analysis assessment on ship-to-shore movement highlighted several deficiencies with the AAV-7 including, “offensive and defensive firepower, water speed, land speed, agility

and mobility, armor protection and overall system survivability."[51] This analysis led to a Mission Need Statement (MNS) for an Advanced Amphibious Assault capability that would serve as the replacement for the AAV-7 and would ultimately lead to an Acquisition Decision Memorandum (ADM) being signed on 19 August 1988 by the Under Secretary of Defense for Acquisition, which began the Phase 0 Concept Exploration activities for the program.[52]

The program analyzed thirteen alternatives as part of the Cost and Operational Effectiveness Analysis (COEA). They ranged in approach from high water speed, low water speed, non-amphibian, and non-vehicle solutions. The results of this analysis confirmed that the Advanced Amphibious Assault Vehicle (AAAV) was the best alternative for meeting the Marine Corps' requirements.[53] To streamline the effort, the Direct Reporting Program Manager, Advanced Amphibious Assault (DRPM AAA) was established which evolved to become the Program Manager, Advanced Amphibious Assault (PM, AAA). Appendix D provides supplementary information and a timeline of the program's history.

For nearly two decades, the debate within the Marine Corps on what the amphibious, forcible entry capability should consist of has been influenced by questions of technical relevance, affordability, doctrine, and the projected operating environment. However, Defense Secretary Robert M. Gates accurately described the decision to terminate the EFV program as follows:

> *The EFV's aggressive requirements list has resulted in an 80,000 - pound armored vehicle that skims the surface of the ocean for long distances at high speeds before transitioning to combat operations on land. Meeting these demands has, over the years, led to significant technology problems, development delays and cost increases. The EFV … has already consumed more than $3 billion to develop, and will cost another $12 billion to build, all for a fleet with the capacity to put 4,000 troops abroad - ashore. To fully execute the EFV, which costs far more to operate and maintain than its predecessor, would essentially swallow the entire Marine vehicle budget, and most of its total procurement budget for the foreseeable*

> *future. To be sure, the EFV would, if pursued to completion without regard to time or cost, be an enormously capable vehicle…As with several other high-end programs cancelled in recent years, the mounting costs of acquiring this specialized capability must be judged against other priorities and needs.*[54]

The Secretary's comments support the notion that the EFV became an albatross for the Marine Corps and would negatively affect other modernization and recapitalization efforts for the remainder of the Marine Corps' combat and tactical wheeled vehicle fleets. To field the EFV would have necessitated the Marine Corps accepting risks in other areas of its equipment portfolio. These risks would then manifest through the degradation of Marine Corps warfighting capabilities across the range of military operations.

Secretary Gates' remarks reveal that the budgetary, requirement and acquisition environments were not capable of supporting the system as envisioned. Informed by these realities, and with the decision to change course made, the Marine Corps needed to articulate its vision on how to replace the aging amphibious assault vehicle fleet. The groundwork to initiate a replacement capability was already underway with the Marine Corps having completed an Expeditionary Armed Forces Initial Capabilities Document and Ground Combat and Tactical Vehicle Strategy (GCTVS) from 2007-2008. These efforts formed the basis for the capabilities based assessment needed to support the development of the Amphibious Combat Vehicle (ACV). In 2010, equipped with an appreciation for the pending budgetary contraction, the Marine Corps conducted a Ground Combat Tactical Vehicle (GCTV) Capability and Capacity Assessment against specified defense planning scenarios.[55] The analysis reconfirmed the lift requirements for the Marine Corps, as well as the capability gaps in the projected operating environment through the continued employment of the existing AAV. Informed by affordability considerations, the optimal course of action for replacement of the AAV was to develop a

modern, yet less technically complex, capability. These alternatives were evaluated in conjunction with the U.S. Navy with the results of the evaluation leading to a relaxation of both the high water speed (a significant cost driver in the EFV) and forcible entry standoff requirements.[56]

Cognizant of the bleak budget environment and armed with an updated requirement, a Systems Engineering Operational Planning Team (SE, OPT) was chartered to provide the Marine Corps combat developers and senior leadership with an accurate assessment of the technical and cost parameters necessary to support the development of the ACV.[57] The output of this effort will prove useful in setting a range of technical performance thresholds and the associated lifecycle costs that are necessary to make an informed decision on what level of capability will be developed by the ACV program. Currently, the Analysis of Alternatives (AoA) for the program is ongoing with results expected to be published in the 3d quarter of FY12. Once the results of the AoA are released, the future direction of the ACV program will become clearer, the cyclical budget reviews will occur, and the requirement will be refined by completing a Capabilities Development Document and Capabilities Production Document, which will be used by the material developers of the system.

Conclusion

> *As announced by the Secretary of Defense in December, the Department has concluded that the cost of recapitalizing the AAV fleet with the EFV in terms of both procurement and sustainment costs is not affordable. The reality is that the 573 vehicles planned for this program, which were projected to cost about $17 million each in production, would alone consume the projected budget for Marine Corps tactical vehicles for a decade, crippling other critical recapitalization requirements within this portfolio.*[58]
>
> *Statement of Hon. Sean Stackley*
> *Assistant Secretary Of The Navy For Research,*
> *Development and Acquisition*

What can be learned about the EFV program? First, it demonstrates that affordability will be a significant factor in determining a program's viability. Secondly, it suggests that requirements for major weapons systems will be subjected to intense scrutiny to make certain that the capability is needed to achieve national strategic objectives. Capability requirements documents will need to allow affordable and technologically mature systems to be fielded in today's threat environment while also taking into account opportunities for future upgrades and improvements. This open-architecture approach to weapons system development will provide a balance between equipping forces in the near term while allowing for changes in the operational environment in future years. This more flexible approach allows technology to mature at its own pace and relieves pressure on a program's schedule. This is important because rushed schedules can have a cascading effect on the program, ultimately leading to increased costs, further delays, or issues with performance. In other words, looking to the future, the "all or nothing" approach will almost certainly result in nothing.

As for capabilities based weapons system development, the EFV's history demonstrates that there is a significant amount of analysis that supports each decision throughout a program's lifecycle. In fact, there have been no fewer than three separate programs established to replace the AAV. The iterative and interconnected decision support processes used by the DoD allows for detailed analysis to support knowledge-based decision-making. However, this decision making approach can be influenced by exogenous factors such as the political environment that is characteristic of our system and the human dynamic.

In some respects, the political environment within which the system operates may influence the negative outlook for defense acquisition. Political pressure, if applied to this system, can distort the analytical decision making process described throughout. Perhaps this is a

necessary condition that requires management at the program execution level, considering that the defense budget represents such a significant percentage of federal spending. However, in exercising its oversight role, it is possible for Congress to inadvertently influence cost overruns, schedule delays or introduce other elements into a program that contrasts with the analytic assessment of a program.

In addition to the political influences described above, the individuals that comprise the workforce influence the system heavily. To support this conclusion, a 2008 GAO report indicates that virtually all JCIDS proposals were validated during the period from 2003 to 2008. From among the 203 JROC Interest initiatives that were examined, 140 were validated (69%). A total of six initiatives (3%) went into an inactive status, which means that they were returned to the sponsor and not resubmitted. The remaining 57 initiatives are in process with their ultimate disposition not yet determined. This subset includes newly submitted proposals or proposals that were returned to the sponsor for updates or clarifications. Subsequent to the JROC review and validation, the report goes on to note that 80% of the acquisition programs subjected to this process enter the defense acquisition system at MS B (program initiation), which implies that the program is fully funded in the Future Years Defense Plan (FYDP) or five-year budget forecast.[59] This indicates that it is not the system that is failing, but the individuals within the system that are failing to take the results of the process and make difficult decisions. These decisions may include failing to validate a requirement, subjecting a program to additional analysis or technology development in order to minimize the technical risks that may be experienced downstream, or cancelling programs.

In describing the system through which the DoD aligns its resourcing strategy to meet the military and defense needs of the nation, it is apparent that the outcome is not always aligned

with the desired end state. In fact, defense acquisitions have been on the Government Accountability Office's (GAO) high-risk list since 1990.[60] The GAO indicates in its 2011 High Risk Series update that DoD weapons systems acquisitions have room for improvement specifically: "(1) develop[ing] an analytical approach to better prioritize capability needs; (2) empower[ing] portfolio managers to prioritize needs, make decisions about solutions, and allocate resources; and (3) enable[ing] well-planned programs by providing them the resources they need, while holding itself and its programs accountable for policy implementation via milestone and funding decisions and reporting on performance metrics."[61] The suggestions for improvement are familiar as the JCIDS process provides an analytical framework to determine and prioritize capability needs. In addition, MDAs and PMs, as "portfolio managers," are empowered to make decisions about solutions and resources, and the PPBE process aligns fiscal resources to support program execution.

Freshly armed with information on the FY13 DoD budget submission, it is clear that downward fiscal pressure within the defense establishment will persist. In the case of curbing "runaway requirements validation," fewer defense dollars will lead to the DoD components having to make the difficult decisions that will not always satisfy the wants of the warfighter. Looked at from a different perspective, this may be a catalyst for a wave of creative and imaginative thinking about how to best fill capability gaps by incorporating all of the elements of the DOTMLPF continuum. On the other hand, fewer defense dollars supporting acquisition programs may erode the technology and industrial base upon which the defense sector and the U.S. military relies.

Clearly, the DoD has a well-established process for initiating, validating, funding and developing the warfighting systems that are necessary for national security. Looking at one

example of how this process works, the EFV program illustrates that the analytical decision making process provides for a robust analysis of defense capabilities. In the case of the EFV, it was determined that the affordability of the system as envisioned would have long term negative impacts on the Marine Corps' capability to conduct a range of other operations. This was the result of what would be an unsustainable investment in one capability at the expense of other needed capabilities. In the end, the interaction of analysis and decision-making allowed for a well reasoned, if not emotional, cancellation of the EFV program. In place of the EFV a new capability will be developed. Changes to the required capability are integrated within the framework of national security strategies. While there are opportunities for outside factors to influence the future direction of the ACV program, objectivity is a hallmark of the acquisitions process within the DoD.

While reduced defense outlays will be typical in the coming years it will make the DoD better practitioners of conducting rigorous analysis and adhering to the results of the analysis. For the Marine Corps, this disciplined analytical approach allowed it to terminate one program while reassessing the need for the capability. Adjustments to the requirement were made so that a technologically mature (and therefore affordable) system can be developed and fielded. This was done in light of the emerging security environment and in a way that ensures that the Marine Corps will continue to develop and maintain core capabilities that complement the amphibious forcible entry capability represented by the EFV/ACV. Outcomes are what count, and in this case the DoD process, as applied by the Marine Corps, resulted in a difficult but wise decision.

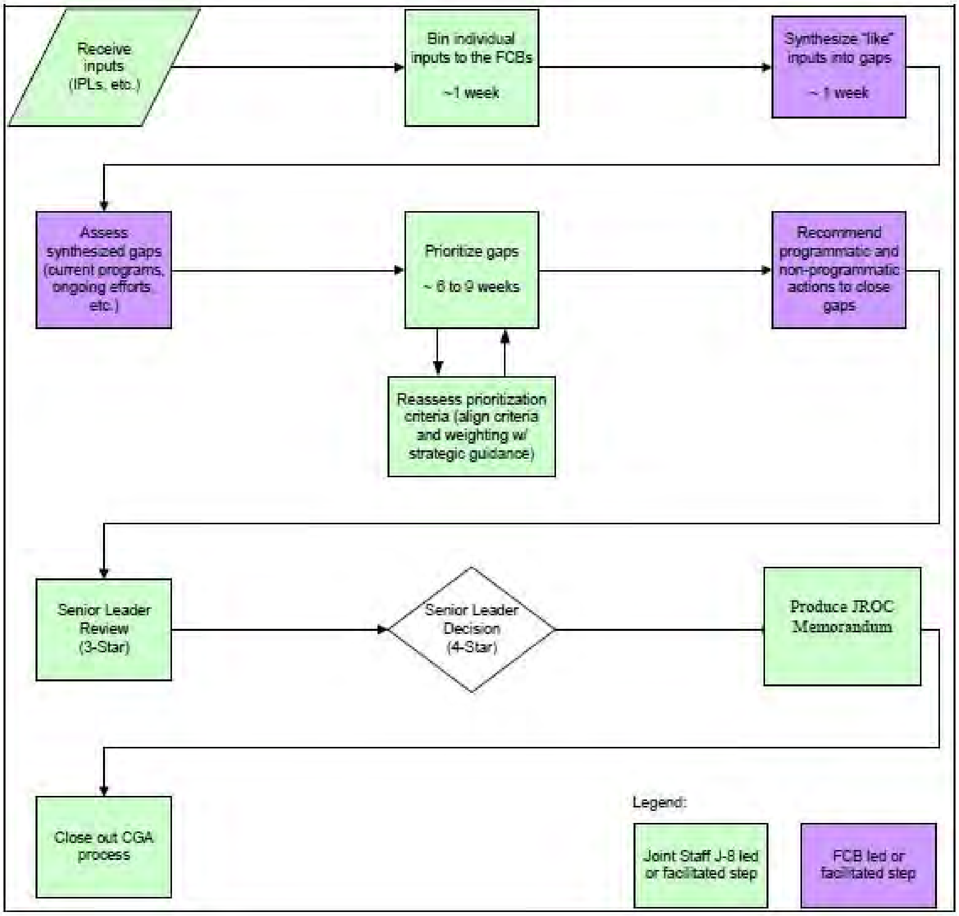
APPENDIX A
DoD Base Budget by Appropriation Title

$ in Thousands *Base Budget*	FY 2011 Continuing Resolution	FY 2012 Request	Delta '11-'12
Military Personnel	135,181,038	142,828,848	7,647,810
Operation and Maintenance	184,486,613	204,423,110	19,936,497
Procurement	104,789,161	113,028,178	8,239,017
RDT&E	80,387,203	75,325,082	-5,062,121
Military Construction	15,920,039	13,071,701	-2,848,338
Family Housing	2,258,698	1,694,346	-564,352
Revolving and Management Funds	3,118,762	2,701,394	-417,368
Total	**526,141,514**	**553,072,659**	**26,931,145**

Note: Reflects Discretionary Budget Authority *Numbers may not add due to rounding*

(Source: US Department of Defense FY 2012 Budget Request Overview)

APPENDIX B
Capability Gap Assessment Ten-Step Process[62]



APPENDIX C
Description and Decision Authority for ACAT I-III Programs

Acquisition Category	Reason for ACAT Designation	Decision Authority

ACAT I	• MDAP (section 2430 of Reference (k))
	  o Dollar value: estimated by the USD(AT&L) to require an eventual total expenditure for research, development, test and evaluation (RDT&E) of more than $365 million in fiscal year (FY) 2000 constant dollars or, for procurement, of more than $2.190 billion in FY 2000 constant dollars
	  o MDA designation
	• MDA designation as special interest
		ACAT ID: USD(AT&L)
		
		ACAT IC: Head of the DoD Component or, if delegated, the CAE (not further delegable)

ACAT IA[1,2]	• MAIS (Chapter 144A of Reference (k)): A DoD acquisition program for an Automated Information System[3] (either as a product or a service) that is either:
	  o Designated by the MDA as a MAIS; or
	  o Estimated to exceed:
	    ▪ $32 million in FY 2000 constant dollars for all expenditures, for all increments, regardless of the appropriation or fund source, directly related to the AIS definition, design, development, and deployment, and incurred in any single fiscal year; or
	    ▪ $126 million in FY 2000 constant dollars for all expenditures, for all increments, regardless of the appropriation or fund source, directly related to the AIS definition, design, development, and deployment, and incurred from the beginning of the Materiel Solution Analysis Phase through deployment at all sites; or
	    ▪ $378 million in FY 2000 constant dollars for all expenditures, for all increments, regardless of the appropriation or fund source, directly related to the AIS definition, design, development, deployment, operations and maintenance, and incurred from the beginning of the Materiel Solution Analysis Phase through sustainment for the estimated useful life of the system.
	• MDA designation as special interest
		ACAT IAM: USD(AT&L) or designee
		
		ACAT IAC: Head of the DoD Component or, if delegated, the CAE (not further delegable)

ACAT II	• Does not meet criteria for ACAT I
	• Major system
	  o Dollar value: estimated by the DoD Component Head to require an eventual total expenditure for RDT&E of more than $140 million in FY 2000 constant dollars, or for procurement of more than $660 million in FY 2000 constant dollars (section 2302d of Reference (k))
	  o MDA designation[4] (paragraph (5) of section 2302 of Reference (k))
		CAE or the individual designated by the CAE[4]

ACAT III	• Does not meet criteria for ACAT II or above • AIS that is not a MAIS	Designated by the CAE[4]

1. In some cases, an ACAT IA program, as defined above, also meets the definition of an MDAP. The USD(AT&L) shall be the MDA for such programs unless delegated to a DoD Component. The statutory requirements that apply to MDAPs and MAIS shall apply to such programs.
2. The MDA (either the USD(AT&L) or, if delegated, the ASD(NII)/DoD CIO or another designee) shall designate MAIS programs as ACAT IAM or ACAT IAC. MAIS programs shall not be designated as ACAT II.
3. Automated Information System: A system of computer hardware, computer software, data or telecommunications that performs functions such as collecting, processing, storing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are:
   a. an integral part of a weapon or weapon system;
   b. used for highly sensitive classified programs (as determined by the Secretary of Defense);
   c. used for other highly sensitive information technology programs (as determined by the ASD(NII)/DoD CIO); or
   d. determined by the USD(AT&L) or designee to be better overseen as a non-AIS program (e.g., a program with a low ratio of RDT&E funding to total program acquisition costs or that requires significant hardware development).
4. As delegated by the Secretary of Defense or Secretary of the Military Department.

(Source: DoDI 5000.02)

APPENDIX D
EFV Program History
(Source: Program Manager, Advanced Amphibious Assault)

PROGRAM DEVELOPMENT & RISK REDUCTION (PDRR) FY95 - FY01

Col James M. Feigley, USMC (June 1993 – August 1998)
Col Blake J. Robertson, USMC (August 1998 – June 2001)
Col Clayton F. Nans, USMC (June 2001 – April 2004)

1995

- Milestone I DAB (15 Mar)
- AAAV enters PDRR Phase

1996

- GDLS was awarded the contract for development of a single AAAV(P) prototype (13 Jun)
- GDAMS established and purchased a building located in Woodbridge, Virginia to house both the Industry and Government team (Aug)
- Ribbon cutting ceremony of the facility (9 Sep)
- Systems Requirement Review (SRR) was held to ascertain the contractors understanding of the requirements for the systems being developed (9-10 Dec)

1997

- DRPM AAA received an updated AAAV(C) Concept of Employment which provided greater detail regarding the requirements for the AAAV(C) and its C4I mission in STOM, SOA and OEO operational concepts
- DRPM AAA issued a stop work direction to the contractor for AAAV(C) tasks in order to re-validate the AAAV(C) variant requirements (Feb)
- AAAV program continued to lead the DoN and the DoD in implementing acquisition reform initiatives and was designated a "Pilot Program" for other initiatives including Simulation Based Acquisition, Electronic Data Interchange, Cost as an Independent Variable (CAIV), and Program Manager Oversight of Life Cycle Support (PMOLCS)

1998

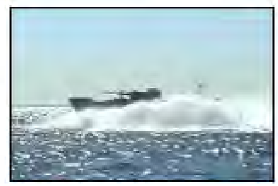
- AAAV Program command turned over to Col Blake Robertson by Col James Feigley (Aug)
- AAAV(C) effort was restarted with the initial effort to determine the concept design (Oct)

1999

- Integration and assembly process commenced for the first of three AAAV prototypes at the AAAV Technical Center in Woodbridge (Jan)
- Roll out ceremony was conducted for the Navy/Marine Corps Amphibious Triad (LCAC, MV-22 and AAAV) at Marine Corps Base, Quantico (23 Jun)
- AAAV Prototype demonstrated maximum land speed of 44 MPH (29 Dec)

2000

- AAAV P1 demonstrated average sustained speed of 30 knots for 63 minutes (12 Oct)
- Milestone II DRM (29 Nov)
- AAAV enters into System Development & Demonstration (SDD) phase (7 Dec)



2001

- Portions of the AAAV team moved into a second facility called the Worth Avenue Technology Annex (WATA) in Woodbridge, VA to build ten second-generation SDD prototype vehicles (Feb)
- AAAV Program command was turned over to Col Clay Nans by Col Blake Robertson (28 Jun)
- GD awarded five-year contract to produce eight (8) AAAV personnel vehicles, one (1) command and control vehicle and one (1) Live Fire Test prototype (Option) in preparation for production (Jul)

SYSTEM DEVELOPMENT & DEMONSTRATION (SDD) FY01 – FY12

Col Clayton F. Nans, USMC (June 2001 – April 2004)
Col Michael M. Brogan (April 2004 – September 2006)
Col John J. Bryant (September 2006 – August 2008)
Col Keith M. Moore (August 2008 – Present)

2002

- Memorandum of Agreement (MOA) was signed between the Program Management Office for Abrams Tank System, DRPM AAA, U.S. Army Tank automotive and Armaments Command, and the Defense Contract Management Agency General Dynamics Land Systems to facilitate the use of Lima Army tank Plant for the AAAV hull fabrication during production (14 Mar)
- AAAV(C) Integration and Assembly Ceremony (28 Aug)
- GDAMS rolled-out the first AAAV(P) SDD (E1) Vehicle for system integration (26 Nov)

2003

- GDAMS rolled-out the first EFV(C) Vehicle for system functional integration (Feb)
- GD manufactured nine (9) SDD vehicles which underwent a series of land, amphibious and firepower testing in preparation for the MS C Operational Assessment (OA) (2003 – 2005)
- RQ Construction awarded contract for the new construction of the EFV Consolidated Training, Maintenance, and Headquarters Complex which would replace the existing Assault Amphibian School (20 Jun)
- The Expeditionary Fighting Vehicle "EFV" name change ceremony took place at Worth Avenue Technology Center (10 Sep)

2004

- Col Michael M. Brogan assumed responsibility of the EFV Program from Col Clayton F. Nans (1 Apr)
- GD selected JSMC at Lima, OH as the manufacturing and assembly site for the EFV (Jun)
- SDD vehicles continued to be manufactured, integrated and tested
- EFV second generation vehicle conducted the first night time high water speed operation (26 Aug)
- E2 ran at high water speed for 62 minutes, averaged 26.1 knots and covered 27 nautical miles in a low sea state, and the vehicle operated at high water speed for 62 minutes and averaged 29 knots in a low sea state
- E3 completed the first Silent Watch test which lasted 60 minutes (Sep)
- Firepower testing yielded a demonstrated probability of hit (Ph) of 0.96 from the gunner's station and 0.91 from the vehicle commander's station (Sep)
- MS C OA Training Readiness Review was conducted (1 Oct)
- OA training began (18 Oct)
- EFV conducted static and underway launch and recovery operations with the USS GERMANTOWN (LSD 42) and a total of twelve static and underway launch and recovery were conducted (12 Nov)

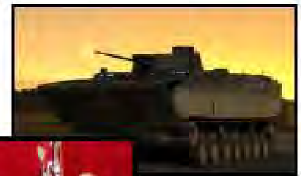
2005

- EFV (C1) completed two 30-minute runs (moderate and high speed water mode checkouts) (Jan-Feb)
- EFV completed one-button reconfigurations to water mode and back to transition mode in less than one minute each
- E4 successfully transported 17 embarked personnel for one hour over cross-country terrain at AVTB (23 Mar)

- E4 successfully transported 17 embarked personnel for 30 minutes each in transition mode and high water speed mode at AVTB (31 Mar)
- The program office and AVTB hosted the History Channel's "Mail Call" with R. Lee Ermey to film the EFV in action (Air date: 13 May)
- OA vehicles (E3, E4, E6 and C1) conducted multi-vehicle C4I testing (Jun)
- Four vehicles participated in testing for "Situational Awareness and Procedures for Multi-Vehicle Amphibious Operations (Jun)
- Ribbon cutting ceremony for the EFV Training Maintenance Headquarters (26 Aug)

2006

- EFV Operational Assessment (OA) (Jan – Sep)
  - Firepower or "Gunnery" Phase
  - Amphibious Phase
  - Land Phase
  - Force on Force Phase
  - Hot Weather Phase



- Col John J. Bryant assumed responsibility of the EFV Program from Col Michael M. Brogan (21 Sep)
- Independent Expert Program Review (IEPR) (30 Oct – 3 Nov)

2007

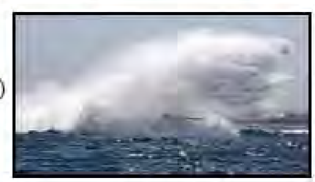
- Program Restructure & OSD Program Reviews (Jan – May)

- EFV Cold Weather Assessment in Valdez, AK (Jan – Apr)
- Establishment of the Program Executive Office for Land Systems Marine Corps. As a result, DRPM AAA position title changed to PM AAA (5 Feb)
- Nunn-McCurdy Congressional Certification (5 Jun)

2008

- Preliminary Design Review (PDR) (2 May)
- Systems Engineering Plan (SEP) approved (20 May)

- Acquisition Strategy Report (ASR) approved (29 May)
- Defense Acquisition Board (DAB) review prior to SDD-2 award (30 May)
- Test and Evaluation Master Plan (TEMP) approved at OSD (7 Jul)
- Award SDD-2 Contract (31 Jul)
- Col Keith M. Moore assumed responsibility of the EFV Program from Col John J. Bryant (7 Aug)
- Special Testing
  - System Level Shock Testing (SLST) at Aberdeen Test Center completed (13 Aug)



- Operational Testing
  - Preparations ongoing for Directional Stability DT/OT event

2009

- **Configuration Design Review (CDR) (Dec)**
- **Begin Fabrication of SDD-2 Prototypes (Oct)**

2010

- **Continue Fabrication of SDD-2 Prototypes (Oct – Dec)**
- **SDD-1 Upgrades / Mod-100 (Nov – May)**
- **Hot Weather Developmental Testing (HW DT) (Jun – Jul)**

2011

- **Reliability Growth Testing (RGT) (Begins Nov)**
- **SecDef Announced Program Cancellation (Jan)**
- **Knowledge Point (KP-2) (Feb)**
- **ADM Released to Cancel EFV Program (May)**

2012

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